

ESOPHAGEAL DIVERTICULA

By E. C. MOORE, M. D., Los Angeles

Diverticula of the esophagus are much more frequent than was formerly appreciated. They ought to be recognized more often and earlier in the course of the disease than they are.

The clinical picture, if formed from all the evidence, is clear and definite.

Good surgery is the treatment of election. The mortality has been much reduced by wider knowledge of what to do and how to do it.

DISCUSSION by George Thomason, Los Angeles; Charles D. Lockwood, Pasadena; and John Hunt Shepard, San Jose.

IN tracing the course of the esophagus, we recognize at its junction with the pharynx, in the median line posteriorly, a union of the oblique muscles of the pharynx and the transverse circular muscles of the esophagus, where there is a small area not covered with musculature, but only a subcutaneous layer. At this point, most of the diverticula occur, due probably to a more than ordinary weakness or a congenital absence of muscle-fiber, which, in the act of swallowing, permits a pushing out of the mucosa and submucosa through this small triangular defect.

The congenital nature of the disease has been based on the analogy to other diverticula of the gastro-intestinal tract; the improbability that the diverticulum on the posterior surface of the esophagus is caused by pull or pressure, because the spinal column offers a rigid background and would prevent any such factors from coming into play; the condition is completely developed when the symptoms first begin to appear. This may be demonstrated by x-ray examination and by gurgling sounds on swallowing, caused by the entrance of air and fluid into the previously existing space of the diverticulum; there are no manifestations in earlier life because the tissues are elastic, but the turgor is lost later in life (at 40), and symptoms may suddenly appear as a result of the condition which has existed for a long time, but has been dormant; and upon the fact that there is no recurrence after radical operation and the characteristic preference for the male.

In the weakened triangle (Lannier-Hackerman area) we find the pulsion or pressure type of diverticula. It is rare to find a true pressure type in any other part of the esophagus.

Traction diverticula may occur at any point, but usually are within the thoracic part of the esophagus and are caused by some previous irritation such as the cicatrix of a broken-down lymph gland or some other pathological condition of the mediastinum pulling on the esophagus. Zenker defines the traction type as one "in which the wall of the esophagus has been dragged outward by an external force."

Beverman found in sixty cases that 73 per cent were due to tubercular infection and other diseases of the lungs, and that pericarditis was responsible for the remainder.

This traction diverticulum is small and usually located at about the level of the bifurcation of the trachea. It is not met with so often as the pulsion and probably occurs under tension. While it may be congenital, it is not progressive. Occasionally, it is

incidentally found while passing the stomach tube or in x-raying the gastro-intestinal tract.

Ordinarily, we find diverticula of the esophagus considered under these two heads. Halstead classifies them as:

A. Pressure or pulsion which include:

1. Those of the pharynx.
2. Those of the pharyngo-esophageal junction.
3. Those originating near the bifurcation of trachea just above the left bronchus.
4. Those deep-seated, whose orifice is a little above the diaphragm, with the fundus of the sac resting on it.

B. Traction diverticula.

C. Traction-pulsion diverticula.

Treatment from a medical standpoint applies particularly to the traction type, and is directed to the primary lesion that is responsible for the production. If mucus or decomposing food is present, lavage is indicated. The patient is advised to avoid coarse food and alcohol. The pulsion type eventually becomes surgical. The larger may prove to be fatal as they increase in size, and as the amount which they can contain not only increases but becomes a source of danger and discomfort from decomposition of the contents, swallowing becomes more and more difficult until, in the extreme picture, the patient in his effort to swallow simply fills up the diverticulum, and little food, even liquid, passes into the esophagus, and unless relieved, starvation may result. Sometimes building up by feeding through a small stomach tube or catheter is necessary, or, in extreme cases, by a gastrostomy. The pouch fills from above; it is oval and the outline distinct. Its location is cervical, posterior or posterolateral in relation to the esophagus, and the diverticulum follows the movement of deglutition.

Percussion may suggest the diagnosis. The use of the catheter and sound may supplement this evidence. The method of guiding the sound by a silk cord, swallowed, and allowed to pass into the intestine until anchored there, is often resorted to. Radiologic examination is necessary.

It is possible to mistake the condition for a high spasm of the esophagus; also it may be interpreted as a dilatation above a constriction and not a sac lying along the esophagus. Different radiograms will promote distinguishing data. The ejection phenomenon is of diagnostic value; this consists of emptying the contents of the diverticulum into the esophagus on deglutition when no food is given. With the possible existence of a diverticulum being kept in mind, together with characteristic history and typical radiographic findings, its recognition often is easy without sounding or esophagoscopy.

The neck of the pulsion diverticula seems always to be small, but the pouch may be large enough to hold ten or more ounces. It gradually enlarges and develops a semi-inflammatory thickening of fibrous tissue, at first in mid-line growing down in front of the spine, then bulging to the sides, increasing usually more to the left. The large sacs grow into the mediastinum and become intra-thoracic; here they increase still more rapidly. Walls of the large

sacs are thinner than those of the small, less fused and easier to separate.

A diverticulum in the esophagus has the same effect as a foreign body which irritates the parts. Symptoms depend upon the size and position. There is a tendency to cough and other signs of irritation, on account of the proximity to the larynx. Clucking and gurgling sounds occur on speaking and swallowing. There may be a sudden explosive emptying of the pouch if the mouth is wide, and there is a strong muscular contraction. There is dryness of the pharynx, difficulty in swallowing, and regurgitation of food. At times food suddenly flows out of the nose when the patient bends over, pieces remaining wedged in the esophagus and not passing down. The patient is obliged to take but small quantities of food into the mouth at a time, swallow completely before taking more food, and may use various manoeuvres of position and pressure to facilitate deglutition. There is excessive secretion of mucus, the breath is bad from decomposed food and constant indigestion. If the pouch is large and filled the patient complains of a lump in the throat. It may be so large as to cause serious respiratory symptoms with increased difficulty in swallowing, relieved by induced vomiting. Pain is not usual unless ulceration occurs.

Fully developed symptoms comprise obstruction, dysphagia, pain, regurgitation, especially when the body is prone or inclined forward. Fetid breath, congested face, cervical tumefaction, gurgling, compression signs, such as dyspnoea, neuralgia, and voice changes are frequent symptoms. The patient is usually nervous, irritable, and choleric. Occasionally, he presents only symptoms of psychosis, and only by exhaustive study is diverticulum discovered.

Medical treatment is often demanded, but is never fully satisfactory. It seeks to keep the pouch empty and overcomes stenosis.

In the pulsion type, surgery is indicated. Good results are obtained. Formerly, surgery was attended with great risk, and performed only to meet an emergency. Local anesthesia was used. The danger then lay in the way the sac was isolated and amputated. Many of them leaked into the raw tissues; sepsis and mediastinitis followed.

There are various methods for eliminating the sac. It can be drawn up by forceps and pushed down inside the esophagus, providing adhesions do not prevent. Other methods include external removal, change of position, and obliteration. The great danger is from leakage and infection, suffocation from the contents of the sac pressing with a subsequent broncho-pneumonia.

If a general anesthetic is used, the sac must be well emptied before attempting surgery, so as to prevent any chance of the contents pouring into the trachea, which would probably produce suffocation or cause a broncho-pneumonia.

Operations may be done in one or two stages. When the sac is small it matters little what method is chosen, but when large and intra-thoracic, the two-stage operation is advisable.

The incision usually recommended is parallel to the anterior border of the sternomastoid muscle. The collar incision is preferred by many. If one-

third of the mass is behind the anterior border of the sternum, and the skin and the platysma muscle is dissected both ways from this, there are few vessels to ligate. By blunt dissection and retractors, the sternomastoid and omohyoid muscles and the anterior jugular vein and common carotid artery are drawn back. Anteriorly, the sac is seen just behind and extending below the cricoid cartilage. The sac is light-colored and has a small plexus of veins over it. The large ones are drawn out with more difficulty, and much care is needed to keep from rupturing the sac. There is not much difficulty in amputating any of the sacs, and suturing at the junction with the esophagus. Two rows of chromic catgut and a small rubber drain are usually placed. Some elevate the sac and fix its fundus to the hyoid bone, to prevent infection, cellulitis, and fistula. Murphy delivered the sac unopened, then twisted it; later amputating, closing fistula and invaginating the sac by sutures.

Only a few hundred operations are on record. The mortality has been given as high. In a series of 200 cases there were reported 16 deaths; in 109, 12; and in 100, 10 deaths and 28 fistulas. Judd reports 3 deaths in 75 cases. The reported mortality of 16.6 per cent includes those cases operated on before rigorous asepsis was observed.

In selecting a method of operation, we want the one where there is least danger from infection, cellulitis, and fistula. I believe the most satisfactory method is where the sac is fixed to the skin incision and left unopened, with its neck ligated to slough out of the packed wound and be removed a few days later. Excellent results have been obtained with this procedure. Owing to the lack of time, I shall cite only my most recent operative case.

A man, age 63, in addition to an esophageal diverticulum, had cataract on each eye. He had seen an eye surgeon for the removal of the cataracts who, on examination, felt that the irritation of the patient's throat with cough and difficult swallowing would interfere with the success of the cataract surgery by breaking open the eye with ensuing disastrous results; therefore, the case was referred to me for treatment of the esophageal condition before further attention to the eyes. The patient had had trouble in swallowing his food for twenty-six years. Within a few minutes after eating, food would be regurgitated. The throat was much irritated, and it seemed as if there were a lump there. The initial symptoms followed diphtheria twenty-six years before, when he believed his throat to be partially paralyzed. The condition never disappeared and became progressively worse during the past eight years. In ten years he had lost thirty-five pounds, was very nervous and had had considerable sore throat, for which the tonsils had been removed.

Radiographs showed a diverticulum of the esophagus. The operation was performed under general anesthesia. The diverticulum was found to arise from the left side of the cricoid cartilage. It was 6 x 3 inches in size, and the neck was about half an inch in diameter. The operation consisted in dissecting and freeing the sac, bringing it out between the sterno-mastoid and sterno-thyroid muscles through a collar incision, with drainage into the sac.

On the sixth day the sloughing sac was amputated. The patient made a good convalescence and was out of the hospital on the eleventh day. A few weeks later the cataracts were removed.

These patients are not considered so rare as they were ten or fifteen years ago, nor as poor surgical risks. There is wider knowledge of the possibility of their existence and a better acquaintance with the typical syndrome they produce. If the patient is in good physical condition, little fear is warranted in making a favorable prognosis. If the patient has become emaciated from inability to swallow food, then we have the task of building him up by feeding, and getting him in fit condition of nourishment before operating. In extreme cases a gastrostomy may have to be done preceding treatment of the diverticulum.

A surgical technic that will prevent leakage and infection is the next step. This has been accomplished, as stated before, by bringing the sac through and attaching it to the skin incision; ligating and amputating later.

With the above points in view, it would seem possible to perform radical operation in these cases of esophageal diverticulum with a small mortality rate, and with ultimate good results.

Merchants National Bank Building.

DISCUSSION

GEORGE THOMASON, M. D. (Hollingsworth Building, Los Angeles)—Doctor Moore has covered the ground so thoroughly that there is little left to be said. I have had a number of these patients in the past few years. One sign which has not been mentioned is that of a change in the contour of the neck, especially, of course, in the larger and more fully developed diverticula. As the patient swallows and the diverticula fills, there is a marked bulging of the neck on that side. With the regurgitation of the food and the emptying of the diverticula, the neck promptly returns to its normal appearance.

The chief reason why the traction diverticula are practically never of surgical importance, is that the opening into the esophagus is usually the lowest part of the diverticula and, therefore, empties readily and does not tend to increase in size or embarrass the function of the esophagus.

So far as operation is concerned, my personal experience has been with the Sippey-Bevan operation of puckering the sac and folding it upon itself accordion-like, thus collapsing the diverticula and plugging the opening with the sac itself.

One fundamental feature for success in any type of operation is to either keep the sac entirely closed as in the Sippey-Bevan operation, or do the two-stage operation of the Jackson-Gaub-Judd type. The absence of any serous coat on the esophagus means almost certain failure so far as immediate closure is concerned, and to open the sac before adhesions have formed around the site of operation is to court disaster from acute mediastinitis.

CHARLES D. LOCKWOOD (Citizens' Bank Building, Pasadena)—I wish to report briefly a case of diverticulum of the esophagus upon which I operated over twenty years ago. I think it is one of the first cases in which the x-ray and an opaque solution were employed for diagnosis.

The patient was a woman about 50 years of age, with a very large diverticulum in the cervical region. An x-ray was first taken with a stomach tube in the esophagus, through which a copper wire had been passed. The tube could not be passed into the stomach, but coiled up in the sac of the diverticulum. Later pictures, with a bismuth mixture filling the sac, gave an excellent outline and revealed the size of the diverticulum.

The patient became so emaciated from regurgitation of food that a gastrostomy was done before attempting removal of the diverticulum. She gained thirty pounds in weight after gastrostomy. The sac was then exposed through the neck, and partially removed. It was so large

that complete removal was impossible. The remaining portion of the sac was plicated and its cavity greatly reduced. The patient remained well for several months and was able to swallow normally, but the diverticulum recurred and she finally died of starvation. In such extreme cases I believe gastrostomy is of great value.

JOHN HUNT SHEPARD, M. D. (San Jose)—A year ago, at our meeting in San Francisco, I read a paper before this Section on this same subject and reported two cases seen during the previous two years. Since then I have seen another case. I am confident that this condition is not as rare as we formerly considered it. These diverticula should be recognized before they attain a large size and seriously interfere with health. There is one point mentioned by Dr. Moore which I wish to emphasize, as I considered it the most important point in technique in all esophageal work. I refer to the use of the silk thread. With a little patience and perseverance it is possible to get the thread through any and every incomplete esophageal obstruction. Though at times it may be advisable to follow the thread with a linen fish-line, or even introduce over the thread a fine piano wire, once the silk is anchored in the intestine the continuance of the examination and treatment is rather easy. By the use of this technique, gastrostomy is practically never necessary. In all cases where caustics have been swallowed, the silk thread should be introduced before cicatricial contraction begins and kept in place until the degree of stenosis is determined. I agree with Dr. Moore that it is preferable to use a two-stage operation in all cases of large diverticula, but as these cases become recognized earlier, there will be fewer requiring the two-stage method.

ROENTGEN THERAPY OF UTERINE MYOMA DURING PREGNANCY

By JOHN D. LAWSON, M. D., Woodland, Calif.

(From the Department of Radiology, Woodland Clinic)

A review of the literature. Full report of one case. For literature reviewed, see Index Medicus or Cumulative Index, A. M. A.

Discussion of the value, indications and contra-indications of extensive roentgen treatment in the pregnant woman.

Pelvic irradiation of females who may become pregnant should be done with much care in selection of cases, and either only very light dosage employed or complete castration effected.

Pelvic irradiation of pregnant females should not be done except where there are very extenuating circumstances, and in any event the patient and her husband should be informed of the possibility, if not probability, of a deficient child.

Irradiation during the later months of pregnancy, if conclusions may be based on the results in six cases, is less injurious to the fetus than irradiation during the early months.

It would seem that the longer the elapse of time between irradiation and subsequent pregnancy, the greater is the probability of a normal child being born.

Radiography should be limited during pregnancy to the minimum.

Roentgen abortion or castration should never be performed except where there are definite reasons why the ordinary surgical procedures should not be followed.

There seems to be little difference between the actions of long and short waves on ova, either fertilized or unfertilized.

Additional evidence and opinions contained in the discussion by Francis B. Sheldon, Fresno; Kurt F. Behne, Los Angeles; Frederick H. Rodenbaugh, San Francisco.

THE selection of title was made hurriedly and unfortunately. Facts which should be brought out in reference to irradiation of the germ cells previous to fertilization, as well as other pelvic conditions treated during pregnancy by irradiation, are not included in the title, but I feel that it is best to